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Surface Dynamics Of Homopolymer Brushes GOKCE UGUR, BULENT AKGUN, The University of Akron, Akron, OH 44325-3909, ZHANG JIANG, SURESH NARAYANAN, X-ray Science Division, Argonne National Laboratory, Argonne, IL 60439, SANGHOON SONG, HEEGU LEE, Department of Physics and Interdisciplinary Program of Integrated Biotechnology, Sogang University, Seoul 121-742, Korea, WILLIAM J. BRITTAIN, The University of Akron, Akron, OH 44325-3909, HYUNJUNG KIM, Department of Physics and Interdisciplinary Program of Integrated Biotechnology, Sogang University, Seoul 121-742, Korea, SUNIL K. SINHA, Department of Physics, University of California San Diego, La Jolla, CA 92093, MARK D. FOSTER, The University of Akron, Akron, OH 44325-3909
— The surface dynamics of polystyrene (PS) and poly(*n*-butyl acrylate) (P*n*BA) homopolymer brushes were investigated by X-ray photon correlation spectroscopy for the first time. Within the range of time (0.2 -1100 s) and length scale (0.2-5 um) studied, no fluctuations of the brush surfaces were detectable. When PS brushes of thicknesses in the range of 9-101 nm and high grafting density (>0.5 chains/nmˆ2) were considered at temperatures up to Tg+130C, no relaxation was visible within our window of in-plane wave-vector. Even reduction of the grafting density from 0.6 to 0.1 chains/nmˆ2 did not bring the relaxation into the window. Likewise, no relaxation was observed for P*n*BA brushes up to 170C above Tg. The suppression of surface fluctuations is a result of covalent tethering.

Gokce Ugur
The University of Akron, Akron, OH 44325-3909

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